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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/521,370  
Filing Date: January 12, 2005  
Appellant(s): KAJIYA ET AL.

\_\_\_\_\_  
Terryence F. Chapman  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed September 15, 2008 appealing from the Office action mailed February 11, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

2002/0197202	Fujino et al.	12-2002
4,101,716	Horowitz et al.	07-1978

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujino et al. (US Pre-Grant Publication 2002/0197202) in view of Horowitz et al. (US Patent 4,101,716).

Fujino et al. teach a process for forming the active material for a positive electrode for a secondary battery (abstract).

Fujino et al. teach that the process involves the steps of:

- a. Providing a manganese oxide ([0028]).
- b. Adding lithium ions to the manganese oxide ([0034]).
- c. Putting the lithium manganese complex oxide in an alkali solution and coating the particles with cobalt from cobalt sulfate in solution ([0041], [0076]).
- d. Drying the mixture ([0042]).

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Regarding claims 1-3, 5 and 8, the material that is produced by this process is a manganese oxide coated with cobalt and containing lithium.

Fujino et al. fail to teach the process in the exact order claimed in the instant invention. It would have been obvious to one having ordinary skill in the art at the time of the invention to change the sequence of adding ingredients in order to facilitate production. It has been held that it involve only routine skill in the art to select any order of performing process steps such as mixing ingredients. MPEP 2144.04 (IV C).

Fujino et al. fail to teach firing the dried mixture.

Horowitz et al. teach a firing process that removes impurities in mixed metal oxides (column 5 lines 1-6, 11-17).

It would be desirable to add a firing step as taught by Horowitz et al. to the method of Fujino et al. in order to remove impurities from the mixed metal oxide.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to add a firing step as taught by Horowitz et al. to the method of Fujino et al. in order to remove impurities from the mixed metal oxide.

4. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujino et al. in view of Horowitz et al. as applied to claim 1 above, and further in view of Kumta et al. (US Patent 6,017,654).

The teachings of Fujino et al. and Horowitz et al. as discussed above are incorporated herein.

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Fujino et al. in view of Horowitz et al. teach the disclosed method but fail to teach a cobalt oxide precipitated with Mn, Ni, Al, Mg or Ti.

As for claim 6, Kumta et al. teach a lithium cobalt oxide doped with magnesium (abstract, column 3 lines 46-65).

Regarding claim 7, teach a lithium nickel oxide doped with, for example, magnesium (abstract; column 4 lines 40-41).

Kumta et al. further teach that these materials improve cyclability and provide high voltage capacity as cathodes in lithium-ion secondary cells (abstract).

It would be desirable to use the materials of Kumta et al. in the process of Fujino et al. in view of Horowitz et al. since the end product would improve cyclability and provide high voltage capacity in cathodes in lithium-ion secondary cells.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use the materials of Kumta et al. in the process of Fujino et al. in view of Horowitz et al. since the end product would improve cyclability and provide high voltage capacity in cathodes in lithium-ion secondary cells.

#### **(10) Response to Argument**

Appellant states, on page 3 of the brief, that there are four crucial steps required in the present invention. Those steps are the four main steps summarized in the brief and found in independent claim 1. Appellant states that when a product is formed by first precipitating and bonding the doping element on the surface of a compound of a metal

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and then adding lithium to the compound of a metal, the product has “excellent initial capacity, cycle characteristics and safety” (p. 3 of the Brief).

The instant specification also discusses the merits of the instant invention over the prior method of mixing fine powders of the compound dopant element with the powders of the compound metal (as discussed on p. 4 of the specification). According to the instant specification, the reason for precipitating the dopant on the surface of the metal compound particles, instead of mixing fine powders and firing, is because this precipitation method yields active material particles that are uniformly coated, having “very high doping uniformity with the minimum ununiformity in doping,” which creates a cell having excellent initial capacity, cycle characteristics and safety (see p. 7, final two lines, and p. 8, first and second paragraphs).

In all of the examples and comparative examples provided in the instant specification, Appellant discusses the merits of a product formed by the method wherein the dopant is precipitated on the outside of the active material particles. As a comparative example, Appellant discusses a product formed by mixing fine powders of the components and firing.

After careful consideration of the teachings in the instant specification, and the summary of the invention provided on page 3 of the Appeal Brief, the examiner concludes that the instantly claimed step of providing the dopant as a coating on the outside of the active material particle using a precipitation step is the part of the instantly claimed method that yields the desired product of the invention. As discussed above, according to the instant specification, when the dopant element is precipitated on the

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surface of the compound of the metal, active material particles that are uniformly coated are produced. Such particles have very high doping uniformity, resulting in a cell having excellent initial capacity, cycle characteristics, and safety.

Fujino et al. teach forming the lithium complex oxide, specifically lithium manganese oxide, and then doping the lithium manganese oxide with cobalt oxide by precipitating cobalt from cobalt sulfate in solution ([0028], [0034], [0041], [0076]). Fujino et al. also recognize that coating the surface of the lithium manganese oxide particles with cobalt oxide remarkably improves cycle characteristics of the battery ([0047]).

It is the position of the examiner that Fujino et al. teach the important step of precipitating the dopant on the surface of the active material particles. Appellant has made no convincing argument, nor does the specification provide convincing evidence, showing that the combination of the first metal oxide with lithium must be carried out before the precipitation step, as instantly claimed, as opposed to after the precipitation step, as is taught in Fujino et al.

The above rejection states that, while Fujino et al. in view of Horowitz et al. do not teach the steps of the instant claims in the order in which they are claimed, it would have been obvious to switch the steps so that the lithium is added to the manganese oxide after the precipitation step (as in the instant invention) instead of before (as is taught in Fujino et al.). Further, the examiner has stated that one having ordinary skill in the art would have been motivated to change the sequence of adding ingredients if such



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a change would facilitate the production of the final active material - for example, if the plant or production line was organized in such a way that moving the lithium adding step would mean that the product was created in a shorter amount of time. Furthermore, it is recognized in the MPEP that selecting the order of performing process steps such as mixing ingredients involves only routine skill in the art (2144.04 (IV C)).

The critical step of precipitating the dopant element as a coating on the active material particle is found in the teachings of Fujino et al. The order of performing the steps of the instant invention is not critical as long as the dopant is precipitated on the outside of the particles - this statement is clearly supported by the specification, as discussed above.

Additionally, Fujino et al. do teach a firing step of the lithium manganese oxide compound prior to precipitation ([0037], [0060]). However, this step is not the final step but rather occurs after before the precipitation of the coating on the particles.

When Appellant argues on page 4 of the brief that none of the presently claimed steps are shown in Fujino et al. (middle of second full paragraph), the examiner is completely unconvinced. Appellant is directed to the above rejection, where it is discussed that the first three steps of the instant invention are clearly taught by Fujino et al., only in a different order in which they appear in the instant claims.

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As for Appellant's arguments from the bottom of page 4 to the top of page 5, the examiner replies that the teachings of Horowitz et al. that are used in the combination are that firing removes impurities in mixed metal oxides. One of ordinary skill in the art would recognize this.

Appellant next discusses the rejection of claims 6 and 7 in further view of Kumta et al. but offers no further substantive arguments that are convincing.

In conclusion, the examiner finds that the changing of the steps of Fujino et al. in view of Horowitz et al. renders the instantly claimed invention obvious, since the final product – of a lithium complex oxide coated with a dopant that is formed by precipitating the dopant on the outside of the particle – is formed in both the instant invention and the combination of Fujino et al. and Horowitz et al.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Alix Echelmeyer/

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